DOCUMENT RESUME

ED 479 508 TM 035 149

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TITLE	Improving Achievement is About Focus and Completing the Right Courses. Research Brief.
INSTITUTION	Southern Regional Education Board, Atlanta, GA.
SPONS AGENCY	DeWitt Wallace/Reader's Digest Fund, Pleasantville, NY.; Edna McConnell Clark Foundation, New York, NY.; Department of Education, Washington, DC.
PUB DATE	2003-00-00
NOTE	16p.; Additional support from Goldman Sachs Foundation.
PUB TYPE	Reports - Research (143)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Academic Achievement; *College Preparation; *Core Curriculum; *Course Selection (Students); *High School Students; High Schools

ABSTRACT

In 2000 and again in 2001, the Southern Regional Education Board (SREB) conducted an audit of course-taking patterns by a total of 4,244 graduating seniors from 51 rural high schools in 12 states. Each school provided data on a random sample of 100 seniors, including special needs students unless they required accommodation for participation in state standardized tests. At least 90 students in each 100 of the sample must have completed the High Schools That Work achievement tests in reading, mathematics, and science and the student survey, or the school was dropped from the study. The baseline assessment data from both years provide evidence that the one change in school practices that can have the greatest impact on student achievement is to have every student complete a challenging academic core and either an academic or career/technical concentration. This change is effective regardless of students' racial and socioeconomic backgrounds. The 13 rural high schools with the greatest proportion of students completing the recommended academic core had significantly more students with mean achievement scores at the proficient or higher levels and significantly fewer students at the below basic level in reading, mathematics, and science as measured by the National Assessment of Educational Progress. (SLD)

HIGH SCHOOLS THAT WORK

Research Brief

SREB

MAKING MIDDLE GRADES WORK

MAKING SCHOOLS WORK

Improving Achievement Is About Focus and Completing the Right Courses

by Gene Bottoms and Caro Feagin

Key Findings

The 2000 and 2001 high school baseline assessment data provide evidence that the one change in school practices that can have the greatest impact on student achievement is to have every student complete a challenging academic core and either an academic or a career/technical concentration. This one change in school practices is effective regardless of students' racial and socioeconomic backgrounds. The 13 rural high schools with the greatest proportion of students completing the recommended academic core had significantly more students with mean achievement scores at the proficient or higher levels and significantly fewer students at the below basic level in reading, mathematics and science as measured by National Assessment of Educational Progress (NAEP)-linked exams. (See Table 3.)

- Students who completed the recommended academic core and either an academic or a career concentration had higher mean reading, mathematics and science achievement scores than students who failed to meet either or both conditions.
- Students completing the academic core and a concentration were more likely to have mean scores at the basic and proficient levels.
- Most high schools have about one-half of their students completing the *HSTW*-recommended curriculum. (See page 2 for the recommended curriculum.) Schools that take steps to get more of their students to complete the recommended academic core and either an academic or career/technical concentration improve student achievement.

In 2000 and again in 2001, the Southern Regional Education Board (SREB) conducted an audit of course-taking patterns by a total of 4,244 graduating seniors from 51 rural high schools in 12 states.[1] Each school provided data from a random sample of 100 seniors, including special needs students unless they required accommodation for participation in state standardized tests. At least 90 of the 100 seniors in each sample must have completed the *HSTW* achievement tests in reading, mathematics and science as well as the student survey, or the school was dropped from the study. **Because the study is a baseline study, the samples and schools in 2000 were different from those in 2001**. Students were assisted by the site-testing coordinator in completing the course-taking portion of the survey.

[1] These 51 high schools are part of an SREB initiative to assist clusters of middle grades and high schools in adopting the *HSTW* and Making Middle Grades Work (MMGW) comprehensive reform design, with an emphasis on improving the transition from middle grades to high school and from high school to post-high school for all students. The intent is to determine if providing more intensive staff development, technical assistance and coaching services will enable these schools to accelerate the pace at which they successfully implement school and classroom practices that result in greater gains in academic achievement. This work is supported by a contract between SREB and the Office of Educational Research and Improvement (OERI), U. S. Department of Education.

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The purpose of the curriculum audit was to find the percentage of students completing each of five different course-taking pathways: mathematics/science concentration, basic college prep, academic core/career concentration, career concentration/no academic core, or no concentration and no academic core, and to determine the impact of each pathway on the academic achievement of students. *High Schools That Work* and states with vocational/education consortiums believe that students who take a solid academic core and a career or mathematics/science concentration will achieve at higher levels than those students who do not.

More specifically, the objectives of the curriculum audit were to:

1. Determine the magnitude of the achievement gaps that exist between the students who complete the *High Schools That Work* (*HSTW*)-recommended curriculum (below) and the curriculums that other students complete; between the top 25 percent of the participating schools and the remaining 75 percent; and between the students in each of the five course-taking pathways.
2. Model for schools a way to analyze the course-taking paths of their own students to determine which pathways lead to higher student achievement; and
3. Suggest actions regarding students' course-taking choices that local districts can implement to improve student achievement.

To ensure that no student was counted in more than one pathway the following criteria were used:

- Students who had completed four years of each mathematics and science with at least one mathematics course in pre-calculus or higher-level mathematics were counted in the mathematics/science concentration path. Some of these students may have also completed a career/technical concentration, but they were counted only in the mathematics/science concentration path.
- Students who had completed at least Algebra II and three science courses but had not taken a career/technical concentration were counted in the basic college-preparatory path.
- Students who had completed the *HSTW*-recommended academic core in mathematics and science and who had also completed a planned series of at least three or four courses in a broad career field were counted in the academic core/career concentration path.
- Students who had completed a series of at least three or four career/technical courses in a broad career field but who had not completed all parts of the *HSTW* recommended core were counted in the career concentration/no academic core path.
- The remaining students were counted in the no concentration/no academic core path.

There are three performance levels: basic, proficient and advanced, in the NAEP-linked tests as outlined in Table 1. The *HSTW* performance goal in reading (279) is about halfway between the basic and the proficient levels; the goals in mathematics (297) and science (299) are at the beginning of the basic level.

The *HSTW*-recommended curriculum:

- Four credits in college-preparatory English language arts
- Three credits in mathematics, with at least two at the college-preparatory level
- Three credits in lab-based science, with at least two at the college-preparatory level
- Three credits in college-preparatory social studies
- Four credits in a planned concentration of academic or career/technical studies

Table 1
HSTW Assessment Performance Levels

	HSTW Goal	Basic	Proficient	Advanced
Reading	279	262	288	317
Mathematics	297	297	328	349
Science	299	299	326	352

What Does It Mean When Students Perform At Goal Level?

SREB research indicates that graduates who meet all three performance goals are much less likely to require remedial work in higher education or in the workplace. In the *HSTW* follow-up study in 2000, of the 7,873 respondents, 5,655 — or 72 percent — had entered some type of postsecondary program of study. Of those who entered such programs, almost 45 percent met all three performance goals. Of those students meeting all three goals, only 24 percent were required to take remedial courses in college. Of the remaining 55 percent (those who did *not* meet the three performance goals), more than 40 percent were placed in remedial studies.

Graduates who meet the *HSTW* performance goals not only have scores at or above the goals, (279 in reading, 297 in mathematics, and 299 in science) but they also demonstrate particular skills and concepts:

In the area of *reading*, these students are able to:

- seek and use information from manuals, journals, periodicals and other documents;
- use information from several sources to make interpretations and draw conclusions;
- identify and solve stated problems; and
- recognize limitations in available information.

In the area of *mathematics*, these students are able to:

- understand concepts from algebra, geometry and probability;
- apply concepts from algebra, geometry and probability in solving multi-step problems; and
- explain reasoning in a number of problem-solving situations.

In the area of *science*, these students are able to:

- apply knowledge, skills and reasoning to interpret scientific and technical data from tables;
- make inferences about outcomes of experimental procedures;
- evaluate the appropriateness of an experiment's design; and
- interpret scientific text and graphs.

Too Many Seniors Are Performing Below the Basic Level

Table 2 shows the percentage of students assessed in 2000 and 2001 scoring at each *HSTW* performance level in reading, mathematics and science.

The results are alarming. In reading, one out of four students scored below the basic level. This result is particularly disturbing because only those students scoring at or above the proficient level are actually able to read on grade level. Furthermore, two out of five students scored below basic in mathematics, and nearly three out of five students scored below basic in science. Clearly these students are not prepared to be successful in either a postsecondary program of study or in the workplace. Students who scored below basic in mathematics, science and reading must certainly be among the nearly 40 percent of current employees classified as having deficiencies — in mathematics, science, reading comprehension, communications and analytical skills — in the 2001 survey of the nation's manufacturers.[2]

Table 2
Percentages of Students At 51 Rural High Schools in 2000 and 2001 Scoring at the Different Performance Levels

	Below Basic	Basic	Proficient	Advanced
Reading	26%	38%	31%	5%
Mathematics	43%	43%	12%	2%
Science	55%	30%	14%	2%

Table 3 shows the results of the achievement scores of students scoring at the different performance levels at the top 25 percent (in achievement) of the rural schools and those students at the remaining 75 percent of rural sites.

As expected, the top-scoring schools have significantly more students with scores at the proficient or advanced levels than do the remaining schools. However, the data show that both groups of schools need to work harder to get more students scoring at the basic level or higher. The results also indicate that there are serious problems in mathematics and science achievement. For example, in science achievement 37 percent of the students in the top schools and 60 percent of the students in the remaining schools are scoring below basic. This indicates that science is not being taught at a level rigorous enough to raise students' achievement scores. It should be noted that students in the high-performing schools ranged from 0 to 48 percent minority, and the percentage of students on free or reduced lunches ranged from 5 to 64 percent.

Table 3
Percentages of Students Scoring at Each Performance Level At the Top 25% and the Remaining Schools

Top 25% of Sites	**Below Basic**	**Basic**	**Proficient**	**Advanced**
Reading	13%	36%	43%	8%
Mathematics	28%	49%	18%	5%
Science	37%	36%	23%	3%
Remaining 75% of Sites	**Below Basic**	**Basic**	**Proficient**	**Advanced**
Reading	31%	38%	27%	4%
Mathematics	47%	41%	11%	1%
Science	60%	28%	11%	1%

[2] Center for Workforce Success and Andersen, *The Skills Gap 2001*, National Association of Manufacturers, 2001.

Course-taking Decisions Have Achievement Consequences

Table 4 shows an analysis of five different course-taking paths at 51 rural high schools and students' mean scores in reading, mathematics and science according to the curriculum pathway completed. Decisions about which courses and which combination of courses students take have important individual consequences for students and collective consequences for the overall performance of a school.

Table 4

Percentages of Seniors Completing Different Course-taking Paths and Their Mean Scores on the *HSTW* Tests

Course-taking Paths	Percentage of Students	Reading[3] Mean Score	Math Mean Score	Science Mean Score
Mathematics/Science Concentration	11%	296**	324*	318*
Basic College-prep Program and No Career Concentration	16%	281*	307*	296
HSTW Math/Science Academic Core and a Career Concentration	26%	280*	302*	292
A Career Concentration and No *HSTW* Math/Science Academic Core	32%	266*	287	274
No Concentration/No Academic Core	15%	257	286	268

Shaded Cells: Below the *HSTW* Goal *Basic **Proficient ***Advanced

[3] *HSTW* goals are 279 in reading, 297 in mathematics and 299 in science.

An analysis of the data shows that:

- Fifty-three percent of the students completed the recommended academic core. The highest achieving students were the 11 percent who completed a mathematics and science concentration. Of the five groups of students, this was the only group with mean scores at the proficient level in reading. These students had statistically significantly higher mean achievement scores than did students who completed the basic college-preparatory/no career concentration path and students who completed the *HSTW* mathematics/science academic core and career concentration. The 16 percent who completed the basic college-preparatory curriculum ranked second in overall achievement; however, the 26 percent who completed the *HSTW*-recommended mathematics and science core and a career concentration scored almost the same. Neither group had a mean score at or above the science performance goal of 299, although the scores were close to the goal.
- The 47 percent of students who did not complete the recommended academic core had mean scores that did not meet any of the *HSTW* performance goals. Students who completed a career concentration but did not complete the recommended academic core ranked fourth and achieved at the basic level only in reading. This group of students did not meet any of the *HSTW* performance goals. The lowest achieving students were the 15 percent who failed to complete either the recommended academic core or a career concentration. Their mean scores were below basic in all three curricular areas and of course they, too, did not meet any of the *HSTW* goals.
- These 51 rural high schools are enrolling only about 50 percent of their students in courses aimed at preparing them for some form of further study, yet 75 percent of these students say they plan to go to some form of postsecondary education. **Leaders in these schools have to ask how we have failed to adequately educate our parents and students about which courses matter in preparing students for further study and/or work.**

Table 5 provides evidence that getting more students to complete an upgraded academic core and/or a concentration improves their chances to achieve at the basic or proficient level. Fifty-eight percent of students in the high-achieving rural schools completed the recommended academic core compared to 50 percent at the remaining schools. Also, these students had higher mean scores in reading, mathematics and science than did students at the remaining schools.

In the top 25 percent of the schools, the highest-achieving students were the 19 percent who completed a mathematics and science concentration, yet even these students did not have mean achievement scores at the proficient level in either mathematics (328) or science (326). In the top 25 percent of the schools, the lowest-achieving students were the 42 percent who failed to complete the recommended academic core. In the remaining 75 percent of the schools, only the 9 percent of students with an academic concentration in mathematics and science met the *HSTW* performance goals in all three subject areas.

Table 5

Percentages of Seniors Completing Different Course-taking Paths and Their Mean Scores on the NAEP-linked Exams

Top 25% of High-scoring High Schools				
Course-taking Paths	**Percentage of Students**	**Reading Mean Score**	**Math Mean Score**	**Science Mean Score**
Mathematics/Science Concentration	19%	294**	325*	318*
Basic College-prep Program and No Career Concentration	20%	291**	317*	314*
HSTW Math/Science Academic Core and a Career Concentration	19%	289**	310*	307*
A Career Concentration and No *HSTW* Math/Science Academic Core	29%	276*	298*	291
No Concentration/No Academic Core	13%	273*	298*	287*
Remaining 75% of the High Schools				
Course-taking Paths	**Percentage of Students**	**Reading Mean Score**	**Math Mean Score**	**Science Mean Score**
Mathematics/Science Concentration	9%	295**	323*	317*
Basic College-prep Program and No Career Concentration	25%	277	301*	288
HSTW Math/Science Academic Core and a Career Concentration	16%	277	303*	290
A Career Concentration and No *HSTW* Math/Science Academic Core	34%	263	285	271
No Concentration/No Academic Core	16%	251	282	262

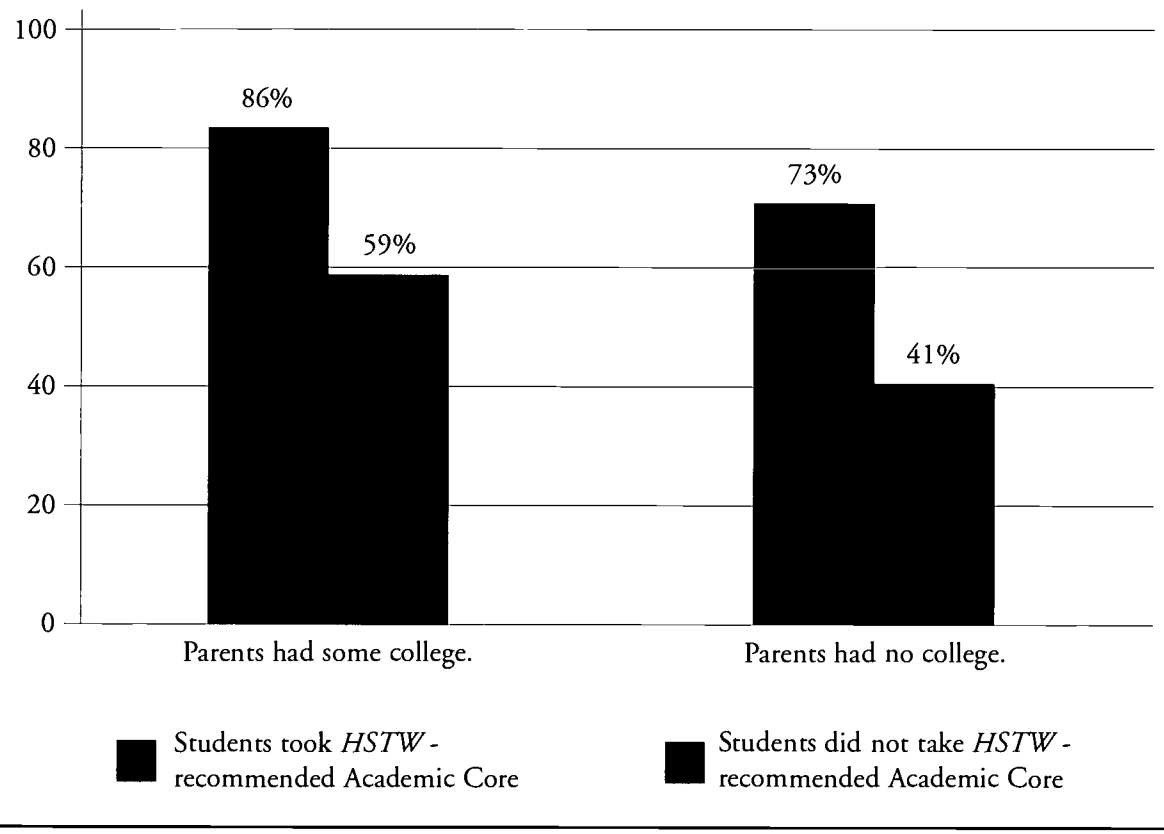
Shaded Cells: Below the *HSTW* Goal *Basic **Proficient ***Advanced

Two conclusions can be drawn from these data. First, students who take the upgraded academic core have higher mean achievement scores than those who do not. Second, the mean scores of many students suggest that they are not performing at a level needed to undertake programs of study beyond high school. Even the top 25 percent of the schools need to better prepare their students with a stronger academic core and a career/technical concentration.

Regardless of students' racial and/or socioeconomic backgrounds, their chances of meeting the *HSTW* performance goals are greatly improved if they complete a challenging academic core. The bar graphs in Figures 1 and 2 illustrate the percentages of students who met the *HSTW* goal in mathematics (297) whether they did or did not complete a solid academic core. The data in these graphs are grouped by the students' racial and socioeconomic background.

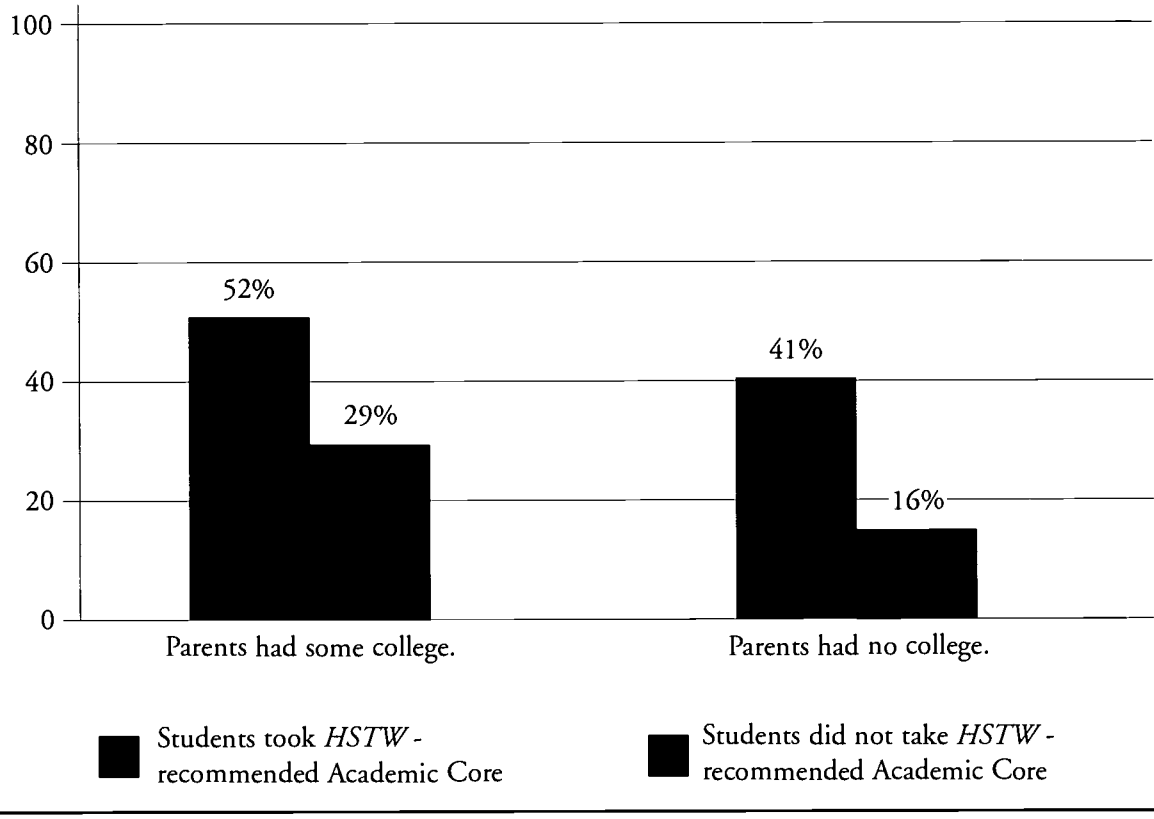
For white students whose parents had no college, 73 percent of students who completed the academic core met the goal in mathematics while only 41 percent of those who did not complete the academic core met the goal. (See Figure 1.)

Figure 1
HSTW Sites 2000/2001
Percentage of White Students Who Met the *HSTW* Goal in Mathematics by Socioeconomic Status



For African-American students whose parents had no college, 41 percent of those students who completed the academic core met the goal in mathematics while only 16 percent who did not complete the academic core met the goal. (See Figure 2.)

Figure 2
HSTW Sites 2000/2001
Percentage of African-American Students Who Met the *HSTW* Goal in Mathematics by Socioeconomic Status

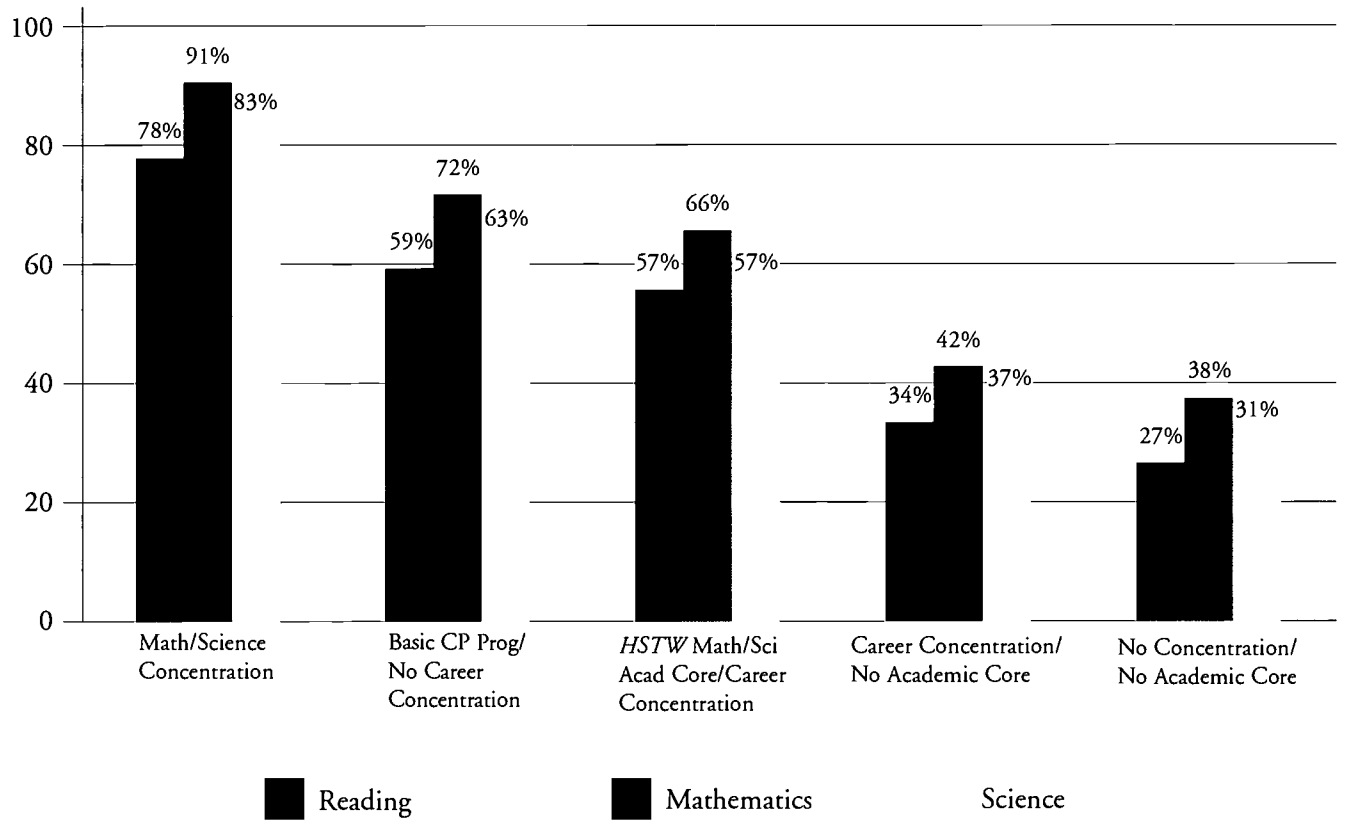


In both racial groups the percentages of students with parents who had some college increased their chances of meeting the goal. For white students whose parents had some college, 86 percent of students who completed the academic core met the goal while only 59 percent who did not complete the academic core met the goal. Similarly for African-American students whose parents had some college, 52 percent of students who completed the academic core met the goal while only 29 percent who did not complete the academic core met the goal.

Analysis of the data according to students' socioeconomic backgrounds yielded similar results in the percentages of students who met the *HSTW* performance goals in reading and in science. Certainly differences in the racial and socioeconomic backgrounds of students contributed to the percentages of students who met the goal in mathematics. **However, Figures 1 and 2 show that the percentages for all groups were greatly increased when students completed the *HSTW*-recommended academic core. Encouraging and supporting poor and minority students to take a challenging academic high school curriculum provides them with a better education.**

The bar graph in Figure 3 shows the percentage of students in all of the schools in the study who met the *HSTW* performance goals (reading: 279; mathematics: 297; science: 299) based on their program of study. At least 57 percent or more of the students in the first three pathways — mathematics/science concentration, basic college-preparatory program and the academic core with a career concentration — met all three performance goals. Roughly, only about one out of three to two out of five (27 to 42 percent) who did not complete the academic core met the three performance goals.

Figure 3
MSW Sites 2000/2001
Percentages of Students Meeting Performance Goals by Program of Study



Looking at the data from this perspective shows again that students who do not take a rigorous core curriculum in high school (about one-half of these students) are not being prepared for any viable future. Forty-seven percent of the students in the 51 *HSTW* schools have mean achievement scores below the *HSTW*-recommended goals. **This indicates that these graduates are prepared only for the 15 percent of jobs that require no formal education beyond high school.** Employers say students seeking a technical or vocational degree will need academic knowledge and skills formerly expected only of a four-year college graduate. While today 60 percent of the jobs require some education beyond high school, it is projected that by 2020, 85 percent of all jobs will require some education beyond high school.

Many current career/technical concentrations are based on low-skill, low-demand high school programs while high-skill, high-demand programs offering 21st century career paths — such as pre-engineering, computer-aided design, computer-aided manufacturing and information technology — are not offered. These schools are contributing to the belief of many forecasters that America will face a shortage of up to 12 million educated workers by 2020.

Different Academic Courses Yield Unequal Results

There is a clear distinction in students' mean scores in reading depending on which English courses they took.[4] Most graduating seniors in this study were enrolled in "general" or "regular" English courses throughout their high school career. School sites in 2001 met the *HSTW* reading performance goal of 279, but school sites did not in 2000. At the sites assessed in 2001, greater percentages of students were enrolled in college-preparatory and academic English courses. There is a significant difference in the mean achievement scores from these two years. For example, in 2000 the 40 percent of students enrolled in academic 12th-grade English had a mean reading score of 286, 15 points higher than the mean score of students enrolled in General English 12. In 2002 the 81 percent of students enrolled in the same academic English course had a mean reading score of 294, eight points higher than the mean score of students enrolled in General English 12. For both years the mean scores of students enrolled in the academic English course were far above the *HSTW* goal of 279. (See Table 6.)

Table 6
Mean Scores in Reading Based on Courses Taken

	Percentage 2000	2000 *HSTW* Score	Percentage 2001	2001 *HSTW* Score
General English 9[5]	56%	271	21%	279
Academic English 9	41%	285	77%	295
General English 10	55%	270	19%	279
Academic English 10	42%	285	79%	294
General English 11	51%	270	14%	284
Academic English 11	41%	286	78%	294
General English 12	47%	271	13%	286
Academic/AP English 12	40%	286	81%	294

Beginning in the middle grades, students need counseling and advice on which English courses to take, and they should be told that if they take academic/honors English, they are less likely to require remediation. Enrolling students in different English courses with different standards at a given grade level could limit students' preparation for an information-based economy.

Table 7 shows the comparison of the different mathematics courses and the mean scores of students who completed them. College-preparatory Algebra I and higher-level mathematics are the courses that make the most difference in raising student achievement.

No high school should enroll students in any mathematics course lower than Algebra I. Students who take courses "equivalent" to algebra and geometry are actually enrolled in remedial courses. These courses may serve to exclude these students from postsecondary education and opportunities in the workforce. Also, about one out of four students were placed in pre-algebra, a course appropriate for grade eight and below. While technical mathematics is allegedly "equivalent" to algebra, the achievement scores clearly show that the standards used to teach algebra are not used in these classes. Apparently, there are at least two levels of algebra that carry the same credit but not the same content, skills and concepts.

A similar pattern is found in the data on science courses. (See Table 8.) Only in college-preparatory or advanced science classes do students approach the *HSTW* goal of 299, which is at the beginning of the basic proficiency level on the NAEP-referenced exams. Only those students who take physics score at or above the *HSTW* goal of 299 in both years. While students in the higher-level sciences outperformed the other students in every case, all science scores need to be improved. Schools must raise local science course content and standards and align them with state and national standards.

[4] Courses designated as basic were not used in the analysis because these courses often are those taken by students on an Individualized Education Plan (IEP).

[5] General English does not include "basic" English, which is usually a designation for special education English.

Table 7
Mean Scores in Mathematics Based on Courses Completed

	Percentage 2000	2000 *HSTW* Score	Percentage 2001	2001 *HSTW* Score
Technical Mathematics I	17%	277	16%	287
Technical Mathematics II	10%	277	12%	287
Integrated Mathematics	4%	279	9%	290
Pre-algebra	22%	293	26%	286
General Algebra I	29%	296	35%	291
College-prep Algebra I	66%	309	51%	305
Algebra II	81%	313	68%	306
Geometry	90%	311	78%	304
Pre-calculus	26%	321	23%	319

Table 8
Mean Scores in Science Based on Courses Completed

	Percentage 2000	2000 *HSTW* Score	Percentage 2001	2001 *HSTW* Score
Earth Science	20%	279	24%	283
Environmental Science	15%	279	14%	279
General Physical Science	27%	282	31%	282
CP Physical Science	11%	284	21%	299
General Biology	59%	291	46%	284
CP Biology	17%	292	36%	303
Anatomy and Physiology	19%	303	14%	294
Chemistry	62%	297	58%	296
Physics	24%	302	21%	300
Principles of Technology I	8%	275	8%	282

CP = College-prep

What Can Local Districts Do?

Action 1

Disaggregate student achievement data to determine the extent to which students are completing all, some or very few of the requirements of a solid academic core and either an academic or career concentration. Then compare the course-taking paths to student performance on state exams, the SAT and the ACT, college placement tests, and employer certification exams. This analysis will demonstrate to teachers, parents and students that failure to take the "right" courses leads to lower student achievement and limits postsecondary opportunities for study and/or work.

Action 2

Support school and teacher leaders in getting all students to complete a solid academic core and either an academic or career concentration by establishing a recommended default curriculum for high school graduation. No student should be excused from completing this curriculum unless a parent, the student and a school representative meet and discuss the long-term consequences of such a decision. The default curriculum requirements for high school graduation would involve a recommended academic core that includes:

- Four years of college-preparatory/honors English that requires students to do frequent reading and writing at grade-level standards.
- At least three years of mathematics to include at a minimum Algebra I in grade 9, geometry, Algebra II **and a high-level mathematics course in the senior year.**
- Three years of college-preparatory, lab-based science courses in which students frequently complete labs and use the labs to gain understanding of science concepts, facts, classifications systems and other essential knowledge.
- Three years of college-preparatory social science that requires students to do frequent reading, writing and analysis of historical and contemporary events.
- Computer proficiency in a variety of software, such as word processing, databases, spreadsheets, presentation packages, e-mail and Web-based research. Students are to use computers and software to complete assignments in academic and career/technical classes throughout high school.

In addition, this default curriculum for high school graduation would include one of the following academic or career concentrations:

- A mathematics and science concentration: four or more credits each in college-preparatory/honors mathematics and science courses with at least one credit at the AP level;
- A humanities concentration: four credits each in college-preparatory/honors English and social studies with at least one course at the AP level and four more credits drawn from foreign language, fine arts, journalism, debate, or advanced-level courses in literature, history, economics, psychology or another humanities area;
- A career/technical concentration: at least four credits in a planned sequence of quality career/technical courses in a broad field of study completed at the high school itself, at an area vocational center, through planned work-site learning, through Web-based courses or on the campus of a nearby postsecondary institution.

Action 3

Require all seniors to complete a major senior project on a topic chosen from their academic or career concentration area. Students could prepare a major research paper on the topic, make a product or perform a service related to the topic, and make an oral presentation before a school and community panel. Work would begin toward the senior project upon entering high school and would serve to put to use knowledge and skills across all disciplines.

Action 4

Establish vertical study teams across grade levels (e.g., all language arts teachers, all mathematics teachers) to:

a) prioritize the essential content, skills and standards to be taught and to what level of understanding;

b) map the curriculum by month or grading period to ensure that content and skills become more complex over time and that there is little, if any, repetition;

c) prepare and share lesson plans, student assignments and exams reflecting the standards in the curriculum; and

d) share and review student work to determine its level: below basic, basic, proficient or advanced. Both teachers and school leaders need to be aware of the intellectual level of assignments and the quality of work that is necessary to get more students performing at the proficient or advanced levels in reading, mathematics, science and social studies. **If students are never asked to perform at the proficient or advanced level, they will never rise to the occasion.**

Action 5

Establish a single end-of-course test that assesses students' understanding of the skills and concepts as defined in the course syllabus in the same subjects, such as Algebra I, geometry, biology and so forth. At least half of the test items should assess knowledge and skills at the higher levels.

Action 6

Create exams in all career/technical courses that measure students' technical literacy:

- the ability to read, comprehend and interpret technical information in the student's broad career field of study;
- the ability to use mathematical concepts, skills and reasoning to solve typical problems in the career field; and
- the understanding of major technical concepts, principles and procedures that are foundational for continued learning in the chosen field of study.

Teachers of career/technical courses should agree to:

- Assign students at least two hours of homework each week on career-related mathematics problems. Technical and mathematics teachers should work together to develop core problems that relate to the students' field of study.
- Have students read a technical article at least every other week in their career field and prepare a written critique on the major ideas in the article. These written assignments should be retained in the students' portfolios. Technical and language arts teachers should work together to develop rubrics to evaluate the written reports.
- Require students to either complete a written report on a completed project or develop a written plan for a project at least once a semester.
- Have students complete an assignment or project using a database or a spreadsheet at least once a semester.

Action 7

Work closely with middle grades leaders and teachers to improve the transition from middle grades to high school by better preparing more students for a successful start in high school. This involves:

- Agreeing on indicators of readiness to do high school level work;
- Identifying students who need to attend a well-planned summer school to better prepare them to succeed in grade nine.
- Making a commitment in grade nine to place many more students into higher-level mathematics, English and science courses and getting the best teachers to lead teams of teachers to teach these courses.
- Identifying students who need a double dose of English and mathematics in grade nine in order to help them succeed in the default curriculum;
- Establishing a system of extra time and help with strong parental support for students to come to school early, stay after school or come in on Saturday should their performance fall below an acceptable level.
- Working with middle grades leaders and teachers as early as grade six to educate students and parents about the rising high school requirements and about what eighth-graders need to know and be able to do in order to succeed in the default recommended high school curriculum.

Action 8

Develop a guidance and advisement system that results in every student establishing a program of secondary studies based on their goals. Before the end of grade nine each student's goals should be determined with the involvement of the parent, the student and the student's adviser and reviewed annually at a joint meeting of the three. More specifically, a revised guidance and advisement system would involve:

- Assigning each student to an adviser who would hold a planned monthly meeting with their advisees and an annual individual meeting with the parent and advisee;
- Having the adviser periodically check student performance to see if students are receiving the extra time and help needed to meet core standards;
- Asking the adviser to review at least annually with students and their parents the student's progress in completing the default high school curriculum.

What Can States Do?

The most important action states can take is to educate teachers, students, parents and the general public that completing anything less than the default high school curriculum increases the likelihood that students will graduate with major achievement deficiencies. There are a number of actions states can take to inform all about the power of challenging high school academic and technical studies:

- Ask students when they take state exams to complete a student survey indicating the courses they have taken in high school and the quality of the high school experience;
- Use this information to prepare reports for schools that disaggregate achievement data based on the quality of students' experiences;
- Inform school and teacher leaders as well as parents and the general public about the changes in practices that need to occur to advance student achievement;
- Work with state, community and technical colleges and universities to have them administer their placement exams to students during the junior year so that those results can be used to **inform parents and students about the actions they need to take in the senior year so that students are better prepared for postsecondary studies**;
- Use career/technical exams to measure what students are learning in career/technical courses and to rank their achievement with that of students' experiences in high-achieving schools and to the sequence of academic courses students have completed.

Summary

While numerous factors influence student academic achievement, none is as important as requiring students to complete a solid academic core and either an academic or a career concentration. This is the cornerstone of preparing high school graduates who can survive in a workplace in which 85 percent of the jobs will require some education beyond high school. **This means making the senior year count, eliminating low-level academic and career/technical courses, and having more students complete the recommended default curriculum.**

This publication is supported by funds from the Wallace-Reader's Digest Funds, the Edna McConnell Clark Foundation, the U.S. Department of Education and The Goldman Sachs Foundation. The opinions expressed here do not necessarily reflect the positions or policies of any of the funding entities, and no official endorsement should be inferred.

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